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ABSTRACT

Policies on microcomputers are presented for four colleges. For Clemson University, purchasing computer hardware and software is addressed. Attention is directed to obtaining approval for purchasing hardware and the policy regarding connecting terminals and modems. Eight steps required for obtaining computers are listed, including those relevant to sole source procurement. The installation of new software, engineering support, and contract programming are also briefly considered. Next, Miami-Dade Community College's procedures for the purchase of microcomputer programs and equipment to support instructional and administrative programs are identified. Procedures for the repair of microcomputers are also covered. An overview is provided of Oberlin College's acquisition and support of microcomputers. A critical factor in the success of the effort is noted: the early realization that user interaction and self-help is an essential element. Finally, policy, procedures, and practices regarding microcomputers at Virginia Tech University are discussed. In addition to briefly discussing hardware and software, attention is directed to approval for microcomputers for students, departments, and computer laboratories. Support for microcomputers on campus is also considered. (SW)

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CURRENT ISSUES FORUM

MICROS ON CAMPUS: POLICY ISSUES

Panel Moderator Kate Doty

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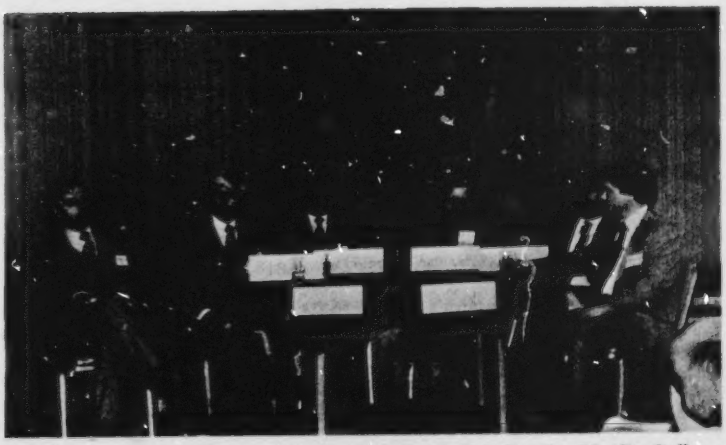
WEDNESDAY CLOSING SESSION

The Conference closed with a forum on one of the most pressing concerns in higher education today—the impact of the microcomputer on campuses nationwide and the consequent need to establish institutional policies concerning their acquisition, support, management, and security.

Panel members George Bosela, Phillip Nicely, Vinod Chachra, Kate Doty, Richard Nelson and Ray Scott discussed a number of issues including the advantages of centralized acquisition of microcomputers, campus bookstores and the microcomputer, support of the microcomputer, the role of the centralized data processing facility with regard to micros, coordination of the micros and the mainframe environment, and what policies need to be created to protect the security of the data. The format allowed substantial audience participation, interaction, and discussion.

Some panel members agreed to share their institutions' policies on microcomputers. Included in this section are the microcomputer policies contributed by Richard Nelson, Clemson University; Phillip Nicely, Miami-Dade Community College; George M. Bosela, Oberlin College; and Vinod Chachra, Virginia Tech.



Panel members, seated from left to right: George M. Bosela, Oberlin College; Phillip Nicely, Miami-Dade Community College; Vinod Chachra, Virginia Tech; Kathlyn E. Doty, Loyola University of Chicago; Richard Nelson, Clemson University; and Ray Scott, Carnegie-Mellon University.

HE017 278

Paper presented at the
CAUSE National Conference
(San Francisco, CA, Dec. 11-14, 1983)

CLEMSON UNIVERSITY

PURCHASING COMPUTER HARDWARE AND SOFTWARE

The Computer Center provides advice and assistance on the acquisition of computer hardware and software. Use of this service is recommended in all cases, and is *required* in the case of equipment or software to be used in conjunction with the main computer.

Before any hardware or software can be acquired, whether on purchase or lease, approval must be obtained from the State Budget and Control Board, Computer Systems Division.

Obtaining Approval

The Computer Center will take the responsibility for securing necessary approvals from the State Budget and Control Board. Anyone wishing to acquire equipment or software must first complete a purchase requisition (CUBO 203) and forward the original to the purchasing office, together with a note indicating that the Computer Center has taken the responsibility of obtaining approval from the State Budget and Control Board. A copy of the CUBO 203 should also be forwarded to the Computer Center along with a memorandum containing the following information:

(1) Requestor's name and telephone number.

(2) A description of the equipment or software.

(3) Location at which the equipment is to be installed. Small items, such as modems and terminals, should be shipped to the Computer Center, where they can be checked out before they are installed.

(4) A justification for purchasing the item.

(5) Planned date of installation.

The State Budget and Control Board requires the following questions to be addressed in any request for approval:

(1) *Why is the item needed?* What function is to be performed by the requested item, how is that function being performed presently, and why is the present method no longer satisfactory?

(2) *Have alternatives been explored?* Could the function to be performed be accomplished by using (e.g. sharing) existing equipment? Are there less costly ways to accomplish the task? What would be the impact if the equipment were not acquired?

(3) *How many people will have access to the equipment?* When installed, how many people of what type (e.g. students, faculty, managers, or programmers) will make use of the equipment?

(4) *How often will the item be used?* With what regularity will the item be used? How many times per day, week, or month will it be used?

(5) *If more than one item of the same type is being requested, why is this number of items necessary?* Could fewer items be used and shared among the requestors?

(6) *Will there be a cost savings?* If the use of the requested itmes will result in a cost savings to the State, please specify when and how much savings will come about. If no cost savings are expected to accrue, please state this also.

(7) *If installation time is critical to the request, please explain why.* Why is it essential that the item be installed at the specific time?

(8) *From where will the funding for the requested item come?*

(9) *Will other items related to this procurement be requested later?* Is the requested item expected to grow in capacity? If so, to what extent? Is this procurement part of a larger plan or is this a stand-alone request?

The Computer Center will prepare a Request for Proposal (RFP) and submit it to the State Budget and Control Board. When the RFP is approved a copy of the letter of approval and the RFP will be sent to the purchasing office and the ordering department. The purchasing office will then issue the purchase order to the approved vendor.

The installation of new teleprocessing equipment (other than dial-up terminals) requires a dedicated communications port. If the user determines that such service is necessary or that changes are to be made to existing equipment, a "Teleprocessing Request" must be completed, then submitted to the Engineering Support Manager and approved by the Director. Those requests which are not approved will be returned along with a written reason for disapproval.

Computer Center staff are available to help in the determination of user needs and will assist in the preparation of the purchase requisition if requested. Academic Computing Support staff will put you in contact with someone who can provide the necessary assistance

Sole Source Procurements

All equipment must be bid unless specific approval for a sole source procurement is given by the State Budget and Control Board. If you wish to "sole source" the equipment you must include a justification in your memorandum to the Computer Center.

Payment

The Computer Center will *not* acquire equipment using its own funds and then bill back to the departments via an inter-departmental transfer of funds. Departments must supply an account number to which the equipment can be charged directly.

Terminal Hookup Policy

Most users do not realize that it costs the Computer Center money to hook up a terminal to the computer, even if the terminal, modems, and the communications line are paid for by another department. Requests for the hook-up of department-owned terminals have reached such a volume that the University is taking steps to ensure that the departments bear the full cost of acquiring and connecting their terminals to the computer.

Remote terminals communicate with the computer via a communications controller, which handles the complexities of telecommunications line control, and it is in the communications controller that the extra cost of attaching additional terminals can be seen. Each line enters the controller via a port, and ports can be acquired individually up to the capacity of the controller. The situation is complicated by the fact that the controller is really itself a computer with limited memory and processing capabilities, and a small number of high-speed lines can exhaust its capabilities as easily as a large number of low-speed lines.

Periodically the Computer Center needs to upgrade its controllers (it has three) to permit the addition of more terminals. To finance these upgrades the University will levy a fee, in the form of a budget reduction, of $1,000 for each new line a department adds to the controller. This does not necessarily translate into a charge of $1,000 per terminal, and those departments acquiring clusters of terminals will, by judicious terminal selection, be able to

minimize the charge. Each asynchronous terminal requires its own line and will result in an additional cost to the department of $1,000. Synchronous terminals (IBM 3270, Telex, Courier) require one line per terminal controller, but can avoid additional lines altogether if they can be multidropped off an existing synchronous line without significantly degrading the response of the terminals already on that line.

Many micro computers and word processors are being sold with software to emulate standard terminals, printer and/or card readers. Since these are not full time terminals, there are restrictions on how they will be allowed to connect to the system. Before making plans to acquire any terminals, please consult with the Computer Center staff to determine the most cost-effective terminal types to suit your needs.

Modems Policy

The Computer Center will make available a set of modems to requestors for a one-time use charge of $1,000. The modems will remain the property of the Computer Center and will be maintained by the Center at no additional cost to the user.

Gandalf modem owners can receive the same service by transferring their modems to the Computer Center inventory.

Forms and Magnetic Tapes

Printer forms and magnetic tapes are purchased under a state contract. Further information can be obtained from the purchasing office.

Summary

The steps required for obtaining computer equipment are listed in 1-8 below. On a "sole source" procurement omit steps 4 and 5. It is assumed that all preliminary investigation and development of requirements has been completed.

Step		*#Working Days Required*
(1)	Submit purchase requisition and memorandum (done by requesting department).	-
(2)	Prepare RFP (done by Computer Center).	**10**
(3)	Release RFP (done by Budget and Control Board.	**10**
(4)	Await bids from vendors.	**15-30**
(5)	Evaluate vendor proposals.	**2-5**
(6)	Obtain approval to award bid.	**5-10**
(7)	Prepare purchase order (done by purchasing office).	**2-5**
(8)	Purchase order received by vendor. Delivery is usually 60 - 120 days.	**10-15**

Procurement of Computer Software

The number of requests by departments, colleges and staff members within the University to the Computer Center for the procurement of software packages has continued to escalate in recent years. In the past, the Computer Center has been able to honor most requests. With the increased number of requests, however, the Computer Center is faced with problems relative to the availability of funds to purchase and/or rent software and with a limitation as to the number of software packages that can be kept operable.

In November of 1979, the Computer Center staff presented their concern to the Computer Advisory Committee. As a result, the Software Acquisition Subcommittee was created and charged with studying the software problem and recommending guidelines for purchasing software to the full committee. The subcommittee presented its findings to the full committee at its regular meeting in March of 1980. The report was adopted and is presented as follows:

(1) Any department, college or staff member within the University wishing to request the addition of a software package to the Computer Center's collection for the academic year, should submit a written request to the Computer Advisory Committee by February 1 of the previous academic year. This request should be accompanied by a support package consisting of the following:

   (a) Specifications for program output, input, and computational algorithms.

   (b) Support expected from Computer Center.

   (c) Anticipated use of software (research, teaching, administrative).

   (d) Name and department of requestor, and approval of department head.

   (e) Justification for software to be reviewed by Computer Advisory Committee.

   (f) List of departments supporting software request.

   (g) Names of three vendors, if known, able to supply the software, and anticipated costs.

(2) All software to be charged to the Computer Center budget or requiring extensive support by the Computer Center must be approved by the Computer Advisory Committee. In the case of software requests exceeding the available budget, the Computer Advisory Committee will determine relative priorities.

(3) All software purchases must be approved in writing by the State Budget and Control Board Division of Computer Systems Management. "Sole source" procurement may not be specified.

(4) Requests for software packages not made by the February 1 deadline may still be considered by the Advisory Committee. These requests may be honored only if they are assigned a high-priority status by the Advisory Committee and if funds are available.

(5) The Advisory Committee will continually monitor the utilization record of all software packages. Packages which are not being utilized or which have a poor utilization record may be deleted from the Computer Center's holdings in order to release funds for the purchase and/or rental of packages which have a higher-priority rating.

(6) All requests should be directed to the Manager of Academic Computing Support.

Installation of New Software

Computer Center staff will gladly assist user departments in the installation of programs that they obtain themselves. However, due to the increase in the number of new programs, such installations must be scheduled to fit in with other Computer Center projects.

Academic Computing Support is compiling a list of user-supplied programs, that is, programs which have been developed or acquired by individual users or departments but which are of potential use to others. This list also contains names of users knowledgeable in the use of each program.

Engineering Support

The Computer Center has a staff of four full-time persons responsible for the maintenance of various items of Center-owned equipment and for the maintenance of the Clemson terminal network. The increasing burden placed on our Engineering Support staff by this large array of equipment significantly reduces the amount of time they can spend servicing other equipment, especially that which is user-owned.

Individuals or departments wishing to obtain service for their equipment should be aware of the following:

- The Center cannot guarantee always to be able to quickly respond to user requests for service on equipment not owned by the Center.
- Center-owned equipment, which is available for use by the entire user community, has first claim on Center personnel.
- Persons acquiring computer hardware should consider some kind of mainteke to know if that hardware can be serviced by the Center should inquire at the Help Desk.
- The Center will not perform repairs or call a vendor maintenance service on behalf of a customer without specific approval from the customer.
- The cost of parts used from the Center's inventory to repair or install user-owned equipment will be billed to the user.

In many cases what appears to be a problem with a peripheral device may turn out not to be in the device itself, but in the communications line or in a device elsewhere in the network. When in doubt as to the nature of the problem, users should call the Help Desk. An Engineering Support staff member will be contacted and he will attempt to make a determination of where the problem lies. The customer will be informed of the diagnosis, and if the problem appears to be in the terminal the customer can decide upon what action to take.

Contract Programming

The Computer Center does not, at present, offer programming services. However, Academic Computing Support maintains a list of programmers willing to do part-time programming. This list will be available strictly as a referral service and the Computer Center assumes no responsibility for the work done by these individuals. Those wishing to program, and staff members with jobs to offer, should contact Academic Computing Support at the Computer Center.

Contract programming is available from the Division of Information Systems Development (DISD) located in the E section of Martin Hall.

MANUAL OF PROCEDURES

TITLE	NUMBER	PAGE
PURCHASE OF MICROCOMPUTER PROGRAMS AND EQUIPMENT TO SUPPORT INSTRUCTIONAL AND ADMINISTRATIVE PROGRAMS	7011	1 of 3
BASED ON POLICY NUMBER AND TITLE	DATE	
VI-1: PURCHASING	January 21, 1983	

I. PURPOSE:

To provide administrative steps to be taken in requesting the purchase of microcomputer programs and equipment for the support of the instructional and administrative programs.

A microcomputer is defined as a stand-alone computing device with provision for in-putting data and out-putting results of stored and programmed calculations. Complete systems, including peripherals and initial systems software must not exceed $10,000. Systems valued at under $1,000 are exempt from steps A, B, C, and D of this procedure, except where the campus Vice President determines otherwise.

II. PROCEDURE:

A. The originator will identify the functional requirements and justification and will submit the proposal to their campus' standing computer review committee. The committee will develop with the originator a purchase requisition, containing technical specifications for meeting the functional requirements. This requisition will cite the appropriate account number of the campus Audiovisual Services area.

B. In the case of campus functions having a counterpart at one or more other campuses, the originator will obtain verification in writing that the subject purchase requisition has been reviewed by the other campus counterparts. A copy of the written comments by the counterparts will be attached to the requisition for final review by the campus standing computer review committee which will address the issues identified by this review process.

If the review process indicates a need for combining requisitions or revising specifications, the standing campus computer review committee will be responsible for developing, along with the originator, the revised purchase requisition.

C. In the case of District Administration where requests for the purchase of microcomputer programs or equipment may have application for use by a campus area, the originator will obtain verification in writing that the subject purchase requisition has been reviewed by the appropriate potential user. A copy of the written comments by the potential user will be attached to the requisition for final review by the appropriate District standing computer review committee which will address the issues identified by this review process.

If the review process indicates a need for combining requisitions or revising specifications, the appropriate District standing computer review committee will be responsible for developing, with the originator, the revised purchase requisition

MANUAL OF PROCEDURES

TITLE	NUMBER	PAGE
PURCHASE OF MICROCOMPUTER PROGRAMS AND EQUIPMENT TO SUPPORT INSTRUCTIONAL AND ADMINISTRATIVE PROGRAMS	7011	2 of 3
BASED ON POLICY NUMBER AND TITLE	**DATE**	
VI-1: PURCHASING	January 21, 1983	

D. Notwithstanding the steps above, the Vice President or his/her designee will verify in writing that the purchase requisition and the attached counterpart comments have been reviewed for true need, and that there are no practical substitutes now or on order to perform the functions for which the procurement is intended.

E. All microcomputer equipment will be placed on the inventory of the appropriate campus Audiovisual Services area, which will be responsible for inventory control, equipment custody, and coordinating the maintenance.

F. All requisitions for the purchase of microcomputer programs will be reviewed by the appropriate Audiovisual Services Director, who will be responsible for maintaining a microcomputer program library for the campus, for coordinating the interchange of programs, for group purchasing, and for avoiding duplication whenever possible. All microcomputer programs will be received by the appropriate campus Audiovisual Services area for inclusion in the College-wide union catalog of library material.

G. Upon receipt of equipment or computer programs, the Audiovisual Services area will notify the requesting office when it has been received and available for use. Where appropriate, the equipment or programs will be delivered for use at Audiovisual Services locations or will be assigned to the user on a custody basis.

H. These procedures will be in addition to all of the normal procurement procedures for appropriate dollar category and should be followed except as indicated under Section I.

Robert H. McCabe 1-3-83

PRESIDENT DATE

INTERIM PROCEDURE FOR THE REPAIR OF MICROCOMPUTERS

The acquisition of microcomputers for educational and administrative activities has recently become a frequent event at the College. Technological advances along with strong commercial competition continue to combine to make the purchase of these devices an even more desirable solution to many of our needs. If the College inventory of these devices continues to increase, and it is clear that this is likely to occur, a Collegewide procedure should be developed for their maintenance and replacement.

The College's experience with microcomputer repair has thus far been limited because of the newness of the devices presently on hand. Printer and disk drive problems have appeared to be the most frequent, but data on these repairs is limited and difficult to compile. A number of departments have purchased maintenance contracts, while others are paying by the hour for repairs. Still others have been fortunate to take advantage of warranty repair. No clear pattern has developed and the best approach is not yet apparent. It is clear that a study must be made of our present experiences and of the experiences of other institutions with similar activities so that the College may develop a long-range plan for the repair and replacement of these devices.

The following interim procedures are recommended:

1. A campus-wide inventory of all microcomputer and peripheral devices will be conducted by the campus Audiovisual Services Department. This inventory will list purchase dates and effective dates of maintenance contracts.

2. The campus Audiovisual Departments will be designated to coordinate the maintenance of microcomputers at each campus. These departments will keep a centralized record of each repair, including contracted repairs.

3. Repairs will be effected using a series of strategies:

   (a) An audiovisual engineer will be dispatched to determine if an in-house repair can and should be executed.

   (b) If outside repair is indicated, warranty repair will be attempted where feasible. Existing maintenance contracts will be used where they are in force.

   (c) When a paid repair is necessary, the Audiovisual Department will coordinate the repair with Campus Services in accordance with existing procedures for the repair of instructional equipment.

   (d) Loaner equipment will be secured whenever possible.

4. This interim procedure will become effective on January 3, 1983. The campus Audiovisual Departments will compile all repair data generated and develop recommendations for a long-range approach, including suggested funding resources, for the repair and replacement of these devices. This report will be received by the Collegewide Communications Technology Committee by September 1, 1983.

Micros on Campus: Policy Issues
Oberlin's Experience

I. Acquisition

The Oberlin program, since the Summer of '82, has been to provide a "mainstream" alternative for the acquisition of personal computers. That alternative was derived through the process of attempting to identify the most important concerns, and potential inhibitions, of the majority of students, faculty, and staff with regard to their acceptance of personal computers. The goals of our program are to encourage the purchase of personal computers by all members of the campus community based on each individual's realization of the contribution to personal productivity that such equipment can make.

The Computing Center became a "dealer", offering a transportable microcomputer with bundled software for sale to the college community at a price slightly above dealer cost. The Center also offered for sale a line of matrix printers, monitors, cables, modems, and other necessary hardware. In addition to providing the above equipment, the Computing Center has undertaken its maintenance at prices substantially below those charged by retail computer stores. The appeal of truly personal, transportable, low-cost, on-campus supported microcomputers with bundled software (most importantly a powerful word processing package) was determined to be the correct formula for most people's needs.

II. Support

Pursuit of the above primary objective has incorporated a number of important supporting activities and strategies. It is important to note that the

Computing Center's program was complemented by a presidential grant program providing partial grants to the faculty and staff of the College for personal computing equipment. While that program preceded our microcomputer support activities, there was enough overlap that most of those receiving grants were able to maximize the purchasing power of their grant by purchasing the equipment that we were offering.

A second supporting strategy was to provide as much institutional peripheral equipment as practical in order to further reduce the amount of money students were required to spend initially. Print stations, to which owners of our equipment could take a file on floppy-disk to be printed on either fast dot-matrix or letter-quality equipment were established, low cost drum plotters were made available, and a publicly available microcomputer cluster was created. The latter action was intended to serve two purposes, to permit prospective purchasers of our personal computer to determine firsthand the package's potential and to allow them to learn what would be involved in making effective use of it. Additional services included providing microcomputers linked to mainframe equipment in order to facilitate information transfer for those who needed that capability only infrequently. All of these actions, and others currently under consideration, are intended to create the most hospitable environment possible for the microcomputer user.

I feel that a critical factor in the success of our program has been our early realization that user interaction and self-help was an essential element of the environment that we were trying to create. An active and pragmatic users'

group can, and should, provide a breadth of support services that an institution could not even consider for lack of staff and financial resources. Secondary and tertiary support structures, formal user group activities and informal interactions which result, are essential to the transformation of a department based program to a community based process. The user group that we unofficially initiated and cultivated provided a sense of comradery that has been very important to those consciously or unconsciously seeking positive reinforcement for their commitment to significant changes in their methods of productivity. The same could be said for those close to making a similar commitment, but still accumulating justification. The user group, meeting twice a month, has provided a forum for the sharing of experiences and the resolution of individual problems. It has provided training in the use of the software provided with the system. Through affiliation with a national users group, it has made available a large library of public domain software. Most importantly it gave visibility to an expanding critical mass of people on the campus with heightened productive capabilities thereby facilitating the process of convincing others that they should follow the same path.

Commencing this academic year the Computing Center has offered a number of "short courses" that deal with the microcomputer we are selling and the word processing program that comes with it. It is noteworthy that these seminars have been by far the most popular ones that we offer. We have also formalized a deferred payment program for students this year which requires a substantial initial payment and allows up to a year to settle the debt.

III. Micro/Mainframe Interface

Oberlin provides ten dial-in ports to support users who have access to microcomputers or terminals with telecommunications capabilities. We have made available to those purchasing micros from us a vendor supplied package consisting of a modem and the software required to communicate with other computers. A significant number of microcomputer owners have acquired the package and use their computer as a terminal to our central systems. We have provided an on-line bulletin-board for microcomputer information in our computer mail system and a on-line library of technical information on equipment, software, and general information.

IV. Security

We have not taken any special measures regarding security.

V. General

I believe that the most important step in dealing with the issue of microcomputers on campus is the first one. The decision must be reached that they are an important institutional concern, one that requires the identification of institutional goals and development of institutional policies. I have concluded that microcomputers are central to our mission as a liberal arts institution. While the potential application of such equipment justifies careful consideration by academicians in all disciplines, perhaps the strongest general case that can be made for incorporating personal computers in an institutional rethinking of higher educational processes is

the impact that they have on the basic process of expressing thought in writing and on the quality of communications. Word processing can be the catalyst for many of the processes that have been traditionally thought of as liberal education. If, as I believe, quality of thought is mirrored in the quality of one written expression, the power and precision that word processing provides the scholar facilitates the refinement of writing and thinking skills. Interpreted in this fashion, personal computing can be viewed to be central to the objectives of liberal education.

While we have experienced all the problems that can be imagined in starting up such an ambitious program, probably our most serious mistake was in under-estimating the demands that it would place on our staff and the implications for maintaining the quality of our traditional services. If I were beginning again I would make a much stronger case for additional staff to support the program. At the on-set, while the dedication of our staff has contributed to what I feel has been a successful first eighteen months, it has not been without its cost in staff frustration and compromise in other areas.

MICROCOMPUTERS AT VIRGINIA TECH

POLICY, PROCEDURES AND PRACTICES

by

Dr. Vinod Chachra
Vice President for Computing
and Information Systems
Virginia Tech University

1. NEED.

Microcomputers, like minis and mainframes, are likely to be used for instruction, research, and administrative purposes. The numbers acquired for research and administrative purposes are certain to be far fewer than those acquired for instructional purposes. Several reasons have been cited for the acquisition of microcomputers: ease of use, low cost, full control, independence from external load or influence, and user convenience. However, the most urgent reason for acquiring microcomputers comes from the potential they offer in changing the device to port ratio. At present, Virginia Tech has some 2100 devices (terminals/micros, etc.). Networking techniques and port contending machines permit the number of computer ports to be somewhat lower than the number of devices. In the case of terminals, each port can easily support two or three terminals. Thus, the terminal to port ratio varies between two and three for acceptable levels of service. It is projected that the number of devices on campus will near 4000 next year and likely be at 6000 by 1986. Under present terminal to port ratios this would require in excess of 2000 computer ports. Two thousand computer ports and the necessary communication and computer capacity to support it will be prohibitively expensive. Hence, as the number of devices increase, the port to terminal ratio needs to be altered. The desired results can be achieved by using microcomputers that are networked to the mainframe. We hope that through the use of microcomputers the ratio of ports to devices can approach 1:10. The deployment of large numbers of micros is likely to change the nature of work done on the mainframes. We anticipate that the overall workload on the mainframe will increase not decrease. However, the work done on the mainframe will be substantially different.

2. OTHER MACHINES

2.1 Mainframes

With the growing use of mini and micro systems it is necessary to identify the application areas where one system is clearly superior to the others. This section tries to identify these application areas. As a general rule large shared computers will be used for the following four purposes.

1. Number crunching.
2. Data requirements.
   a. Large amounts of data.
   b. Small amounts but shared with large groups.
   c. Data archiving.
3. Special software.
4. Special devices.

2.2 Minicomputers

Use of minicomputers will be governed by their impact on personnel costs. As a general rule, minicomputers will be used under the following situations:

1. Minicomputers will be used in sponsored research projects where the sponsor so designates.

2. Minicomputers will be used in environments where the software requirement is very limited (like seismic data analysis), where the clientele is very restricted (like spatial data analysis lab) and where the machine can run essentially unattended. The objective is to reduce the personnel and software costs associated with the installation.

3. Minicomputers will be acquired and supported through departmental budgets. Departments must provide a personnel impact statement prior to the acquisition of minicomputers.

3. SOFTWARE

The technical and managerial issues associated with microcomputers are important issues. However, in large organizations like Virginia Tech, the most important issue is acquisition and management of software. Assume that the campus population of faculty, staff, and students collectively buy 2000 microcomputers. (Clearly this number is too small for Virginia Tech.) Assume further, that the systems require some package like Fortran or Lotus 1-2-3. The package can cost anywhere from $300 to $500. Simple multiplication will show that one can invest between $600,000 and $1,000,000 in a simple package unless alternate strategies are sought and implemented.

At a cumulative price of around half a million dollars for a simple software package, it suddenly becomes very attractive to consider developing software for inhouse consumption. Clearly, the marketplace cannot tolerate a situation where large groups like Virginia Tech are compelled to consider developing their own software. Hence, one must conclude that the marketplace will insist that suppliers of software make attractive volume discount or educational discount arrangements. It will be the policy of the University to seek out attractive financial arrangements for the acquisition of software.

4. APPROVAL

4.1 Approval for Student Micros

Certain colleges and departments may require their students to buy a personal computer in support of the academic programs in which they are involved. The internal approval process for mandating that departmental students purchase their own machines is as follows:

1. A recommendation from the departmental curriculum committee justifying the need for the personal computers and stating how the machines will be used in the curriculum offered by the department is the required first step. The department's recommendation has to be approved by the College Dean.

2. The financial implications of this requirement need to be discussed with the Vice President for Finance and the academic implications with the Provost.

3. The President must approve the decision. He will probably seek the approval of the Board of Visitors as the decision impacts the cost of education at Virginia Tech.

4. An RFP must be prepared, reviewed and approved by the Vice President for Computing and Information Systems. If State funds are not used, approval from MASD in Richmond is not necessary. However, if State funds are used (for laboratory or faculty machines) additional approval from the State must be sought.

5. The RFP must be mailed out to an approved vendor list. Responses must be evaluated and a selection made following procurement procedures established for this purpose by MASD. The University has completed such a process for the College of Engineering and selected the IBM family of personal computers for use in the college curriculum. The negotiated contract with IBM permits the purchase of these machines by students from all programs at Virginia Tech. The negotiated discount is passed on directly to the students.

4.2 Approval for Departmental Microcomputers

1. Departmental microcomputers may be purchased either through the same contract that has been negotiated for the students or through one of the many contracts approved by the State.

2. The department may acquire the machine that best suits its program needs subject to the procurement policies of the State.

3. It is recommended that the machine acquired by the department be one that is supported by the University (see the section on support).

4.3 University Acquired Machines

1. It is a policy of the University to provide general purpose laboratories consisting of terminals and personal computers for use by students, faculty, and staff.

2. These laboratories will be installed and equipped by the Computing Center.

3. There will be no chargeback associated with the use of the personal computer laboratories as long as the laboratory is used in a standalone mode. The laboratories must be used only for purposes approved by the University.

4. Personal computers located in the laboratories will normally be connected to the campus data communications network. Connections to the mainframe and its use will be charged at normal rates for mainframe usage and will be governed by policies in place for mainframe use.

5. SUPPORT

It is the present policy of the University to provide local support for microcomputers on campus. The local support will consist on the following:

1. The Computing Center will coordinate the maintenance of the micro computers. The Computing Center will maintain a record of each machine and owner showing the equipment and the maintenance options in effect. This information will be used for producing statistics on the nature, use and reliability of microcomputers on campus.

2. The Computing Center will receive all computer shipments, unbox and test each machine for proper operation prior to delivery to the customer (faculty, staff, and students).

3. The Computing Center will establish procedures to provide warranty maintenance on the machines.

4. The Computing Center may subcontract with other departments on campus (like the Electrical Engineering Department) to provide hardware maintenance for the machines.

5. The Computing Center and user departments will jointly evaluate software offerings and determine a set of software that will form the software tool kit. Efforts will be made to negotiate institutional licenses for the software. Where institutional licenses are not possible, volume discounts will be negotiated.

6. The University will adhere strictly to all software laws pertaining to the acquisition and use of copy-righted software.

7. The Computing Center will attempt to acquire such software that best integrates with software already available on the mainframes and minicomputers on campus.

8. The Computing Center will provide adequate documentation for the software and hardware that is part of the microcomputer program.

9. The Computing Center will not be involved in the acquisition and distribution of supplies, like paper and diskettes. The supplies are best purchased from the University Bookstore.

10. The Computing Center will provide the needed training courses or acquire and make available training diskettes so as to appropriately train the user community.

11. The Computing Center will provide consulting services on a resource-available basis to faculty and graduate students to insure the proper and effective use of personal computers. Such consulting services will not be open to undergraduates who must contact their class instructors for help.

12. It will be the objective of the University to arrange for financing from time to time to permit faculty and students to buy personal computers on a time payment plan.